SPIRIT LAKE

Introduction

Spirit Lake is a small augmented lake in the High Uintas. It is one of the few lakes in the vicinity of the ridgeline that is accessible by road. Because of easy access, the area has heavy recreational pressure. A lodge and campground border the lake, and concessionaires offer horseback rides, etc.

Spirit Lake is a natural cirque lake that was augmented by construction of an small earth-fill dam. The shoreline is owned by the Ashley National Forest, and public access is unrestricted. Reservoir water is used for irrigation, but the lake can only be drained six feet below original lake level. The dam raised water level five feet, and a trench to the dam allows the irrigation company to lower water level six feet below the original lake. The remaining water is never drained, functioning like a natural lake. The lake is 11' deep when it is drawn down to this level. Water use is not expected to change in the foreseeable future.

Recreation

Characteristics and Morphometry

Lake elevation (meters / feet)	3,103 / 10,180
Surface area (hectares / acres)	16.6 / 41
Watershed area (hectares / acres)	823 / 2,033
Volume (m^3 / acre-feet)	
capacity	678,426 / 550
conservation pool	0
Annual inflow (m^3 / acre-feet)	
Retention time (years)	
Drawdown (m^3 / acre-feet)	
Depth (meters / feet)	
maximum	5.5 / 18
mean	4 / 13
Length (meters / feet)	731 / 2,398
Width (meters / feet)	244 / 801
Shoreline (meters / feet)	1,700 / 5,578

Location

County	Daggett
Longitude / Latitude	109 59 50 / 40 50 30
USGS Map	Whiterocks Lake, 1963
DeLorme's Utah Atlas & Gazetteer™	Page 56, A-1
Cataloging Unit	Flaming Gorge (14040106)

Spirit Lake is accessible from the Sheep Creek Road southwest of Manilla. Sheep Creek Road (Also called S p i r i t

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Lake Road) originates at the southwest corner of the Sheep Creek Geological Loop, and becomes the North Slope Road of the Uintas. Follow this road for about 11 miles to where Spirit Lake Road bends to the south. It is also possible to begin on U-150 in the Bear River area and take the North Slope Road to this intersection. The lake is about 8 miles south on this road. The route is well marked.

Fishing, boating, swimming, camping, horseback riding, picnicking, and hiking are all popular.

Recreational facilities at the reservoir include Spirit Lake Campground, a USFS facility with toilet facilities, picnic areas, and 24 campsites. It has no drinking water.

Spirit Lake Lodge is located on the western shores of the lake. It has a variety of facilities including a convenience store with lodging and horseback rides.

Nearby Tamarack Lake, slightly larger than Spirit Lake, was also augmented as a reservoir, but has been purchased by the state to be maintained as a natural lake.

The boundary of the High Uintas Wilderness Area is the western boundary of the cirque, and the Spirit Lake area is a popular trail head for wilderness users.

Watershed Description

Spirit Lake is in the High Uintas. The watershed consists of one large cirque with several subcirques in it. Upstream lakes include Jesson Lake, Columbia Lake, Summit Lake and Lily Pad Lake. The meadow/forest/marsh areas of the cirque bottom are surrounded by the barren, boulder covered slopes of the Uinta ridgeline, which towers over 1,000 feet over the lakes. Slopes often exceed 120%.

The watershed high point, an unnamed peak two miles south of the lake, is 3,679 m (12,070 ft) above sea level, thereby developing a complex slope of 22% to the lake. The average stream gradient above the lake is 3.9% (218 feet per mile) The inflow and outflow is Middle Fork Sheep Creek. Snowmelt continues throughout much of the summer, the snow acting as a natural reservoir to provide a constant supply of water to the lake.

The watershed is made up of high mountains and mountains meadows. The soil associations that compose the watershed are listed in Appendix III.

The vegetation communities consist of alpine, pine, spruce-fir and aspen. The watershed receives 76 - 102 cm (30 - 40 inches) of precipitation annually. The frost-free season around the reservoir is 0 - 20 days per year.

Land use in the watershed is mostly recreation, although some grazing and logging takes place. At present, no timber sales are planned for the watershed.

Limnological Assessment

The water quality of Spirit Lake is very good. It is considered to be very soft with a hardness concentration value of approximately 9 mg/L ($CaCO_3$). There are no overall water column concentrations that exceed State water quality standards

Current data suggest that the reservoir is nitrogen limited. TSI values indicate the reservoir is mesotrophic in a state of moderate productivity. The reservoir does not stratify as indicated in the August 12, 1992 profile due to the shallow nature of the lake. DWQ monitoring crews reported a maximum depth of 1.6 meters (5 feet) at the time. This was probably a result of further removal of water by the irrigation company, evaporation, or the measurement not at the deepest point.

According to DWR no fish kills have been reported in recent years. DWR stocks the lake annually with approximately 7,000 catchable rainbow trout (*Oncorhynchus mykiss*). The lake has not been chemically treated by the DWR, so populations of native fishes are likely present in the lake. The DWR has not

treated the lake for rough fish competition, so populations of native fishes may be present in the lake.

Phytoplankton in the euphotic zone include the following taxa (in order of dominance):

Limnological Data

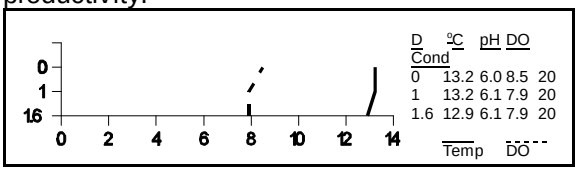
Data sampled from STORET site: 593825

Surface Data	1981	1990	1992
Trophic Status	O	M	M
Chlorophyll TSI	-	45.25	41.70
Secchi Depth TSI	48.40	49.31	51.14
Phosphorous TSI	25.80	38.72	42.70
Average TSI	37.10	44.43	45.18
Chlorophyll a (ug/L)	-	4.45	3.1
Transparency (m)	2.0	2.1	1.85
Total Phosphorous (ug/L)	20	11	15
pH	6.3	7.3	6.9
Total Susp. Solids (mg/L)	<5	3.75	<3
Total Volatile Solids (mg/L)	-	-	1
Total Residual Solids (mg/L)	-	-	2
Temperature (°C / °f)	10/50	14/57	12/54
Conductivity (umhos.cm)	14	24	21
Water Column Data			
Ammonia (mg/L)	0.05	0.03	0.12
Nitrate/Nitrite (mg/L)	0.08	-	0.01
Hardness (mg/L)	9.5	9.1	8.3
Alkalinity (mg/L)	5	12	7
Silica (mg/L)	-	-	2.5
Total Phosphorous (ug/L)	20	18	15
Miscellaneous Data			
Limiting Nutrient	N*	N	N
DO (Mg/l) at 75% depth	8.4*	7.3	7.9
Stratification (m)	6-7*	NO	NO
Depth at Deepest Site (m)	7*	1.5	1.6

* Second period 1980

Species	Cell Volume (mm^3/liter)	% Density By Volume
Sphaerocystis schroeteri	2.641	72.28
Peridinium sp.	0.361	9.89
Staurastrum sp.	0.167	4.56
Dinobryon divergens	0.147	4.02
Pennate diatoms	0.140	3.83
Mallomonas sp.	0.127	3.47
Asterionella formosa	0.028	0.78
Oocystis sp.	0.025	0.68
Centric diatoms	0.013	0.37
Ankistrodesmus falcatus	0.004	0.12
Total	3.650	
Shannon-Weaver [H']	1.08	
Species Evenness	0.47	
Species Richness [d]	0.41	

The phytoplankton community is dominated by the presence of green algae, flagellates, desmids and diatoms. This is indicative of good water quality and low productivity.



Pollution Assessment

Nonpoint pollution sources include the following: sedimentation and nutrient loading from grazing; and litter and wastes from recreation.

There are no point sources of pollution in the watershed.

Beneficial Use Classification

The state beneficial use classifications include: boating and similar recreation (excluding swimming) (2B), cold water game fish and organisms in their food chain (3A) and agricultural uses (4).

Information

Management Agencies	
Uinta Basin Association of Governments	722-4518
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146
Ashley National Forest	789-1181
Flaming Gorge Ranger District	784-3445
Recreation	
Dinosaurland Travel Region (Vernal)	789-6932
Manila Chamber of Commerce	784-3395
Reservoir Administrators	
Sheep Creek Irrigation Company	784-3412

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